Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (original) A rotation sensor for detecting an angle of rotation of a rotating member, comprising:

a rotor mounted to the rotating member for rotation together therewith, said rotor having an annular element;

a magnetic coil/core unit arranged opposite to said annular element and fixed to a fixing member, said magnetic coil/core unit including a core body, and an excitation coil for carrying an AC current and forming a magnetic circuit, wherein said annular element having a width varying along a circumferential direction of said rotor such that when said rotor is rotated, said annular element causes impedance of the exciting coil to change in accordance with a rotation angle of said rotor; and

a detection device electrically connected to the exciting coil, for measuring a rotation angle of the rotating member based on change in the impedance of the exciting coil.

2. (original) The rotation sensor according to claim 1, wherein the width of said annular element gradually increases along a half-circumference of said rotor and then gradually decreases along a remaining half-circumference of said rotor such that said annular element has a minimum width and a maximum width.

3. (original) The rotation sensor according to claim 2, wherein said magnetic coil/core unit forms a magnetic circuit when the AC current is applied to the exciting coil, said magnetic circuit extending from the core body and passing through said annular element.

4. (original) The rotation sensor according to claim 3, wherein said annular element is made of an electrically conductive material and generates an eddy current therein which causes the impedance of the exciting coil to change as said rotor rotates.

5. (original) The rotation sensor according to claim 3, wherein said annular element is made of a magnetic material and causes an air gap between said annular element and said magnetic coil/core unit to change as said rotor rotates, to thereby change the impedance of the exciting coil.

6. (original) The rotation sensor according to claim 3, wherein said rotor is made of a magnetic material, and said magnetic coil/core unit forms a magnetic circuit in cooperation with said rotor when the AC current is applied to the exciting coil, the magnetic circuit passing through said annular element.

7. (original) The rotation sensor according to claim 3, wherein the sensor further comprise further includes a yoke member arranged such that said rotor is located between the yoke member and said the magnetic coil/core unit, and said coil/core unit forms a magnetic circuit in cooperation with the yoke member when the AC current is applied to the exciting coil, the magnetic circuit passing through said annular element.

8. (original) The rotation sensor according to claim 3, wherein said sensor comprises a plurality of magnetic coil/core units arranged along the circumferential direction of said rotor.

9. (currently amended) The rotation sensor according to claim 8, wherein said plurality of magnetic coil/core units include a first magnetic coil/core unit which is located at a circumferential position of said rotor where said annular element has the minimum width, and a second magnetic coil/core unit which is located at a circumferential position of said rotor where said annular element has the maximum width when the rotating member is located at ~~the~~ a neutral position, the first and second magnetic coil/core units being separated from each other in a diametrical direction of said rotor, and said detection device includes a first measurement section for measuring the rotation angle of said rotor, based on a difference between changes of the impedances of the exciting coils of the first and second magnetic coil/core units when the impedances of the exciting coils have changed.

10. (original) The rotation sensor according to claim 9, wherein said plurality of magnetic coil/core units further include a third magnetic coil/core unit arranged at a substantially intermediate position between the first and second magnetic coil/core units in the circumferential direction of said rotor, and said detection device determines a rotating direction of the rotating member based on change in the impedance of the exciting coil of the third magnetic coil/core unit.

11. (original) The rotation sensor according to claim 10, wherein said plurality of magnetic coil/core units further include a fourth magnetic coil/core unit separated from the third magnetic coil/core unit in a diametrical direction of said rotor, and said detection device further includes a second measurement section for measuring the rotation angle of said rotor, based on a difference between changes of the impedances of the exciting coils of the third and fourth magnetic coil/core units when the impedances of the exciting coils have changed, and a selecting section for selectively outputting the rotation angle measured by the first or second measurement section.

12. (original) The rotation sensor according to claim 8, wherein said magnetic coil/core unit includes a set of two magnetic coil/core units arranged both side of said rotor, respectively, said set having the core bodies facing to each other with said annular element of said rotor therebetween.

13. (original) The rotation sensor according to claim 12, wherein said annular element includes two annular elements associated with the core bodies of said set, respectively.

14. (original) The rotation sensor according to claim 12, wherein said rotor includes an inner ring portion to be mounted to the rotating member and an outer ring portion connected to the inner ring portion through bridges, the outer ring portion being formed as said annular element.

15. (original) The rotation sensor according to claim 12, wherein said sensor comprises a plurality of sets each including said two magnetic coil/core units, said sets being arranged along the circumferential direction of said rotor.

16. (original) The rotation sensor according to claim 8, wherein said rotor includes an inner ring portion to be mounted to the rotating member and an outer ring portion connected to the inner ring portion through bridges, the outer ring portion being formed as said annular element.

17. (original) The rotation sensor according to claim 1, wherein the width of said annular element gradually increases along a circumference of said rotor such that said annular element has a minimum width and a maximum width at positions close to each other.

18. (original) The rotation sensor according to claim 1, wherein the maximum width of said annular element is smaller than a diameter of the core body.

19. (original) The rotation sensor according to claim 1, wherein the rotating member comprises a steering shaft for a motor vehicle, the steering shaft allowing torsional deformation thereof such that there is a relative rotation angle between opposite ends thereof, and said rotation sensor further comprises a sensing device for detecting the relative rotation angle of the steering shaft.

20. (original) A method of detecting an angle of rotation of a rotating member, comprising the steps of: arranging a magnetic coil/core unit near a rotor rotatable together with the rotating member, the magnetic coil/core unit having a core body and an exciting coil for carrying an AC current and forming a magnetic circuit, said rotor having an annular element whose width varies along a circumferential direction of said rotor, said annular element causing impedance of the exciting coil to change in accordance with a rotation angle of the rotor; and measuring a rotation angle of the rotating member, based on change in the impedance of the exciting coil.